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For eight stars the observed results have shown no appreciable variations.

If all of the thirty-seven stars are binary systems, as their composite spectra indicate, it is reasonable to expect that some of the periods of revolution are long, in which cases the spectrographic observations, made within short periods of time, would not be able to detect variations in their radial velocities. It is also to be expected that the orbital planes of some of the systems are nearly perpendicular to the observer's line of sight, and the spectrograph is powerless to detect motions within those systems. So far as our spectrographic observations are concerned, there is no reason to doubt that all of the thirty-seven stars are binary systems.

Four or five scores of the naked-eye stars have been found at various observatories to have two sets of lines in each of their recorded spectra, with the two sets essentially or nearly alike. The two sets of lines proceed from the two close components of binary systems, and the spectra are in fact composite, but in practice the term "composite" has been applied only to the combination of spectra of very different types.

W. W. CAMPBELL.

THE VARIABLE VELOCITY OF β CYGNI

The brighter component of the well-known double star *β Cygni* ($\alpha = 19^{h} 27^{m}$; $\delta = +27^{\circ} 45'$) has been observed for radial velocity with the Mills spectrograph on twenty-five nights between 1898 and 1918 inclusive. There were indications in 1910-11 that the velocity varies slowly. The observations secured in 1917-18 converted the indications into certainty. The observed radial velocities are as grouped below, the subscripts indicating the number of individual results upon which the group velocities depend.

1898-01, $V_5 = -25.3$ km./sec.
1904-07, $V_2 = -24.4$
1910-12, $V_6 = -23.2$
1913-14, $V_6 = -23.0$
1917-18, $V_6 = -21.6$

The fainter component in the visual binary system is 35″ from the brighter component, in position angle 55°, and no appreciable change in the relative positions of the two components has been observed in the century or more covered by position observations.

The observed variation in the radial velocity of the brighter component is therefore not due to orbital motion in the visual system.

In *Annals Harvard Observatory*, **28**, Part 1, 98, 1897, the spectrum of the brighter component of *β Cygni* is described as "composite." It is in general of the type corresponding to yellow stars, such as *Arcturus* or *α Cassiopeiae*, but has also the strong hydrogen lines and the weak and narrow K calcium line characteristic of many blue stars, such as *Sirius*. The composite spectrum "could be explained on the supposition that the brighter member of the visual double star is itself double, one component being a star of the 'second type' (yellow), the other a star of the 'first type' (blue), approaching the second type." Our observed radial velocities are confirmatory of the Harvard hypothesis that *β Cygni* is a triple system. The period of revolution in the spectroscopic binary system comprised in the brighter component of the visual binary is apparently of considerable length, inasmuch as the radial velocity varies slowly and the variation observed in twenty years seems to have been in only one direction.

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AN INTERESTING DOUBLE STAR

In the course of the radial velocity program of this observatory, the star Boss 6158, R. A. $23^h\ 54^m.4$, Dec. + 33° 11′ (1900) was observed. This star is a double, No. 12675 Burnham's *General Catalogue*, the separation of the components being now in the neighborhood of 2″. They are of equal magnitude, visual 6.58, photographic 7.08 and of the same type about F5. Burnham plots their relative motion which he states is "apparently rectilinear."

It seemed to me, when they were so close together in the sky and of equal magnitude and type, there was a high probability that they were physically connected. If in addition their radial velocities proved to be nearly the same, this probability would be greatly strengthened.

It will be of interest as showing the actual performance of the new installation to give the particulars of observation and measurement. Spectra of each have been obtained on five nights with the single prism form of the spectrograph, linear dispersion 35A per mm. at Hγ. The spectra are all well exposed altho the average exposure time given each star of 7.08 photographic magnitude was 19.6